

AVIATION WEEK

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APRIL 18, 1949

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FIRST IN RUBBER



AVIATION WEEK

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AVIATION CALENDAR

Apr. 16—FAA-PISA annual meeting of the Maintenance Assoc., Washington, D.C.
Apr. 16—AIAA-ASME joint meeting meeting, Hotel Statler, Dallas, Tex.
Apr. 17—AIAA-AIAA joint aircraft design conference, Marshall Auditorium, 3000 Peachtree Rd., Atlanta, Ga.
Apr. 18—Annual meeting, American Optometric Association, Atlanta, Georgia, Hotel Statler, Ga.
Apr. 19—Annual meeting, American Society of Aerospace Engineers, Oklahoma City.
Apr. 20—Annual meeting, American Optometric Association, Atlanta, Georgia, Hotel Statler, Ga.
Apr. 21—Annual meeting, American Society of Aerospace Engineers, Atlanta, Georgia.

Apr. 22—AIAA-AIAA joint aircraft design conference, Atlanta, Georgia, Hotel Statler, Ga.
Apr. 23—Annual meeting, American Optometric Association, Atlanta, Georgia, Hotel Statler, Ga.
Apr. 24—AIAA-AIAA joint aircraft design conference, Atlanta, Georgia, Hotel Statler, Ga.
Apr. 25—AIAA-AIAA joint aircraft design conference, Atlanta, Georgia, Hotel Statler, Ga.

May 1—AIAA national conference, Institute of Aerospace Science, Birmingham, Ala.
May 1—AIAA-AIAA joint aircraft design conference, Atlanta, Georgia, Hotel Statler, Ga.
May 2—AIAA-AIAA joint aircraft design conference, Atlanta, Georgia, Hotel Statler, Ga.

May 3—AIAA-AIAA joint aircraft design conference, Atlanta, Georgia, Hotel Statler, Ga.
May 4—AIAA-AIAA joint aircraft design conference, Atlanta, Georgia, Hotel Statler, Ga.
May 5—AIAA-AIAA joint aircraft design conference, Atlanta, Georgia, Hotel Statler, Ga.
May 6—AIAA-AIAA joint aircraft design conference, Atlanta, Georgia, Hotel Statler, Ga.

May 7—AIAA-AIAA joint aircraft design conference, Atlanta, Georgia, Hotel Statler, Ga.
May 8—AIAA-AIAA joint aircraft design conference, Atlanta, Georgia, Hotel Statler, Ga.

May 9—AIAA-AIAA joint aircraft design conference, Atlanta, Georgia, Hotel Statler, Ga.
May 10—AIAA-AIAA joint aircraft design conference, Atlanta, Georgia, Hotel Statler, Ga.

May 11—AIAA-AIAA joint aircraft design conference, Atlanta, Georgia, Hotel Statler, Ga.
May 12—AIAA-AIAA joint aircraft design conference, Atlanta, Georgia, Hotel Statler, Ga.

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May 21—AIAA-AIAA joint aircraft design conference, Atlanta, Georgia, Hotel Statler, Ga.

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Light weight—the lightest weight

engine in its power class. The Cyclone 9E weighs only 1390 pounds—less than one pound per horsepower.

...reduced operation—Lessons of lower fuel consumption and improved cylinder cooling characteristics.

...low maintenance and overhaul costs—because of the simplicity of design inherent in single-cylinder engines.

...other advanced features—turbo-

jetison for automatic power control and to prevent use of anaerobic gasoline fueling—water injection for maximum take-off horsepower with 100 octane fuel.

Since its early association with the Douglas twin-engine transport, the Cyclone 9 has steadily progressed with this "father of the airplane." Today it is ready again to improve the performance and extend the usefulness of the DC-3.

POWER FOR AIR PROGRESS

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WRIGHT

NEWS DIGEST

DOMESTIC

K. E. Van Every, chief of aerodynamics, Douglas Aircraft Co., last week was presented the Wright Brothers Medal in 1943 at the National Aerospace and Air Transport meeting of the Society of Automotive Engineers in New York. Award was given for his paper "Aerodynamics of High-Speed Airplanes," delivered last October at the SAE aerospace meeting in Los Angeles.

United Helicopters has announced

the award of a contract worth \$1.5 million to a New York City East River port

company—a coast guard flight covering 5,200 miles and including 1,000 miles across the northern portion of the country. Stanley Miller, Jr., company president, plotted the route on the last leg of the route.

Port of New York Authority formally took title to its Teterboro Air Terminal, completing its purchase of the Bellanca airport for \$5,155,000. Pending a permanent management assignment, Fred L. Wilson, former owner, will continue as president of the Teterboro Air Terminal Corp., operator of the field.

FINANCIAL

Texas Engineering & Manufacturing Co. has decided to appraise a strategic nation plan including the issuance of 500,000 shares of common stock, of which 447,000 shares will be exchanged for the 111,073 shares of no par common stock outstanding. In addition, \$10,000 of the net assets in excess of par value capital is transferred to the capital account, bringing the latter to \$47,880.

Bush Aircraft Corp. declared a quarterly dividend of 25 cents per share on its 199,565 shares outstanding on April 16, 1969. Gross sales for the quarter ended Mar. 31 were about \$4,600,000.

FOREIGN

Dutch Netherlands Aircraft Co. (Dfkl) has completed the prototype of a new transport aircraft built to KLM specifications. Although KLM's entire fleet consists of U.S. aircraft, the line is seeking a series of its own Dutch aircraft industry as a source for new transport equipment.

India's Parliament has appropriated \$30 million for the Indian Air Force for the 1969-70 fiscal defense expenditure.

The Indian Army will receive 500 tanks and the Navy 130 ships.

Brazil has submitted plans for the construction of a large airport at Coari in the northern State of Parana. It will be capable of handling four-engine aircraft.

INDUSTRY OBSERVER

► **Panama Helicopter Co.**, Morton, Pa., was Navy competitor for a short-haul helicopter (Aviation Week, Mar. 7), which will place XHHP-1, tandem seat, into service. Navy officials announced last week to buy 105 helicopters for fleet duty to owners and carriers for rescue, communications and observation work. Building the HHP will be Panama's second helicopter production job for the Navy with 10 HRP-1, ten-place transport helicopters delivered to the Navy and Marinas and for all-metal HRP-2 helicopters now under construction. Panzer's competitor for the fleet seats came from Sikorsky's five-place RJS helicopter.

► Convair's recently won a Navy design competition for a water-borne fighter with its Skystreak, a jet-powered flying boat fighter that can also function as an attack plane and is designed for speed in the transonic range. Only other entrant was Curtiss-Wright. Convair will build an experimental prototype of the Skystreak for Navy evaluation.

► Clinton L. Martin Co. has designed a new set of wings for the XP5M-1 experimental flying boat designed to test long afterbodies on flying boat hulls. Original XP5M-1, now under test at Patuxent River, used an old set of Martin Marine wings on an otherwise designed hull. Martin hopes to sell the new wings of the XP5M-1 to the Navy as a wave-band anti-submarine patrol plane.

► Convair's MPF-1, radically designed flying boat patrol bomber, has been sold out of the San Diego plant to assist in dear Allison T-40 turboprop engines. The first experimental 3590 hp T-40 is now installed in the nose of a B-57 for initial test flying by Allis in Indianapolis. Navy will probably buy the PTW in two versions, one for tactical operations in a long range, high speed (460 mph) patrol bomber and the other in a transport. In the transport category the PTW is in competition with the Martin JRM-2, latest version of the Mars.

► Convair will probably get an Air Force order for 28 additional LC-125 liaison planes out of fiscal 1970 funds. The LC-125 is an off-the-shelf purchase of the Convair model 135. USAF now has an order in for 12 of fiscal 1969 funds.

► Louis G. Bousquet Cong. USAF deputy chief of staff for research, told a Congressional committee that the United States now lags two years behind the Soviet in jet engine development. Cong added that the United States is rapidly catching up and should be even with the Soviets in a "short time."

► USAF and Navy are seriously interested in developing use of fibreglass in aircraft construction. USAF general test flight before Congress that fibreglass is stronger per weight and thus slimmer and lighter than aluminum.

► Boeing has the largest share of USAF inflight controls, with approximately 50 percent of the total business, according to Maj. Gen. B. W. Wolfe, director of procurement for the Air Materiel Command. Wolfe said Convair was No. 2 on the USAF list with Douglas and Lockheed in third and fourth place. Wolfe also indicated that 65 percent of USAF aircraft business goes to those four firms with the remaining 15 percent distributed among eight other defense manufacturers.

► Allison-Glenn Illustris F35 jet engine now requires refueling every 45 hours after afterburner use in the Republic F-105 fighter. Total engine life is now four overflights or about 180 hours. The company has an interval of 570 hours between overhauls on the Pratt & Whitney S-1330 jet engine.

► Two top USAF development projects are the slow-opening parachute and an automatic aircraft rocket launcher. The slow-opening parachute is designed for high altitude high speed bursts where experience has shown that the opening rate of chutes now in use imposes loads that has resulted in broken rods and cracked chutes when the chute pops. Automatic rocket launcher is now ready for installation in combat aircraft for tests in air-to-air firing.

Box Score**What Truman Wants:**

New procurement	Aircraft	Total new		
subgroups	weight	subgroups		
(million)	(million lb.)	(million \$)		
Air Force	616.90	1669	25	54.6
Navy	687	843	9	98.6
TOTAL	\$723.97	2512	34	

What Vinson Wants:

Air Force	Aircraft	Total		
(million)	(million lb.)	(million \$)		
871.91	2772	38	56.1	
Navy	1030	1563	17	55.1
TOTAL	\$1770	4335	55	

What Appropriations Committee Wants:

Air Force	Aircraft	Total		
(million)	(million lb.)	(million \$)		
871.97	2499	41.8	55.3	
Navy	687	843	9	54.6
TOTAL	\$5794	3393	50.8	

Air Power Budget at Record High

Boost in President's request would put procurement funds at \$2.9 billion and buy 3393 new aircraft.

By Robert Hora

Recent passage of military air power budget recommendations by the House Appropriations Committee for fiscal 1949 were expected to be approved by the House next month.

Busted air power budget would buy 3193 new planes with average weight of 50.8 million lb. at a total cost of \$2.9 billion. This compares with 3670 planes last year weight 45 million lb. I expected for out of \$2.7 billion total last year for new aircraft procurement in fiscal 1948.

► **Second Step.** Congressional approval of the Appropriations Committee recommendations would make the second step in the postwar expansion of U.S. air power power budget. The first step, proposed by the President's Air Policy Commission and the Joint Congressional Air Policy Board last year, The fiscal 1949 appropriations would make the aircraft industry functioning nearly about to the level used by both groups for a period of "emergent, transitional" conditions and would bring the U.S. Air Force up to 18 full strength combat groups just

of the projected 75 full combat groups.

The House Committee's recommendations also were awaiting legislative action by the U.S. Senate.

Additional aircraft procurement was set to start in November, year USAF expects to get a better three \$360 million increase in its budget from Congress. The House group asked Congress to boost President Truman's proposed USAF budget by \$85 million. This compares with \$532 million increase added by Congress last year.

► **More Planes.** The additional \$151 million would influence USAF to request for 2550 new planes with average weight of 45.8 million lb. at a cost of \$2.77 billion. This is new aircraft procurement program will consist of 2214 aircraft and \$11,992 million in construction authority. All of that money would be for new aircraft whereas \$935 million of \$1 billion fiscal 1948 procurement funds were spent for finding expansion of plant facilities and other direct and indirect help to basic expansion of the aircraft industry.

In addition to the new acquisitions the budget carries as item of \$600 million in cash to liquidate contracts let at

between 1946-49 and \$75 million to pay off contracts made between 1942-46. This \$75 million must be compensated because of a statutory limitation of three years an expenditure of funds. To avoid a similar situation if funds in the current appropriation are allowed to remain available until expended.

► **Cost.** The additional \$151 million would be without a doubt for B-52 bombers and spare parts, \$4 million on B-36 equipment overhauls, \$13 million on four other airplane contracts and \$10 million on 79 research and development contracts.

The \$851 increase adds \$81 million aircraft and approximately \$510 million in aircraft procurement funds to the President's budget. Also included in this boost is an \$18 million item for research and development to finance the following projects:

- Interceptor fighter development.
- Bomber development.
- Design studies.
- Ground attack plane development for Army support operations.
- New helicopter development.
- Guided missile development on a "particularly promising" basis.

Broadside of the added funds will be spent in ground building equipment for new aircraft, radar, personnel, and maintenance and operations for the 10 groups added to the President's 48 group plan.

► **Group Breakdown.** The 10 additional groups will consist of the number below. These figures show one long range group, one short range group, one transport group, and one light bomber group. The original 48 group program contained three heavy bomb groups, 11 medium bomb groups, six strategic reconnaissance groups (3 photo, 2 weather and one mapping), one light bomber group, 17 day fighter groups, three all-weather fighter groups, one tactical reconnaissance group and one transport group (four heavy, two medium). The 18 separate squadrons are 11 medium squadrons and 7 strategic support squadrons, totaling C-97As as strategic bombers, Douglas C-47As as medium bombers, Douglas C-46As as transport groups for the heavy and medium bomb groups.

The Air National Guard programs call for three light bomber groups and 24 day fighter groups. Air Reserve programs will be expanded around three types of groups, a light bomber group equipped with Douglas C-45s, a light transport group equipped with Douglas C-45s, and a medium transport group equipped with Curtiss-Wright C-46s. At present the Air Reserve program has

only 42 B-26s, 5 C-47s and 1290 T-6 transports. It is planned to add 50 B-26s and 500 C-47 and C-46 transports to make a total plane strength of 1636.

► **Plane Shoots.** The Air Force also revealed some of its future plans for assignment of new and obsolescent aircraft. It plans to convert 5 day fighter squadrons (two Regulars and one National Guard) to all-weather fighters in view of the fact that these planes become available.

The Air National Guard

F-51

will be the later version of the Lockheed Neptune. F-51 and Lockheed Neptune (TF-51) aircraft and Convair PBY Flying Boats. Both of the Neptunes will be replaced by HIPI-1, seven plane rescue type, with some 1800-2 all metal transport helicopters.

► **More Jets.** Navy procurement will reflect a further emphasis on jet planes and planes with 65 percent of its fiscal 1949 procurement going for jets compared with 14 percent in 1948.

Tonight is also known as carrier and more expensive aircraft with an average weight of 3193 lb. in 1948 compared with 3665 lb. in 1949. Navy cited the average cost of a jet powered aircraft as \$259,537 compared with an average of \$694,434 for a piston-engine powered plane. This increase in cost and cost reflected the Navy's original quota of 1557 new planes for fiscal 1949 as an annual procurement of 1223.

Navy sources, led by Vice Admiral John D. Price, deputy chief of Naval operations for air, initially assailed the President's budget for Navy Aviation as grossly inadequate. Admiral Price maintained that in the 1950 rate of procurement the Navy's air force would be reduced to an operating force of less than 3600 planes by 1955.

► **Cut in Planes.** Interim reduction will cut the Navy's air service force to a total of 14,953 planes available on Feb. 1 to 13,920 by July 1 and down to 12,886 by July 1 of 1949. Large aircraft carriers will be reduced from 11 to 8 operating to 8 with a reduction of two air

carrier combat groups. The Navy administration testified that they needed a total of 3800 more aircraft to bring naval aviation in a state of "readiness" and that an additional 846 planes were required to attain 3393 present strength in three years.

According to the present Naval air force budget, the carrier aircraft carriers of the Malibou and Essex types will be open along with four light carriers and four escort carriers. Total of 22 air groups including 14 long carrier groups, 5 medium groups and 34 jet plane squadrons will be maintained during fiscal 1949.

Research and development fund cuts in the President's budget will force the Navy to abandon development of five advanced aircraft prototypes and delay development of four more aircraft from now to mid-1950. The Vought Corsair will be the latest version of the Lockheed Neptune (TF-51) aircraft and Convair PBY Flying Boats. Both of the Neptunes will be replaced by HIPI-1, seven plane rescue type, with some 1800-2 all metal transport helicopters.

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According to the present Naval air



MCDONNELL'S VOODOO ALTOFT
Speaker through its press office, McDonnell (MF-84) twin jet production fighter shows test pilot Bob Edelsohn putting the

report on the 1938 fuel cost Committee's appropria-tion bill. "The committee were simply invited to hear of the demands of Civil Aviation Board," greatness as \$8 million gift of the taxpayers' money by the Big Four's airline for maintenance of oil well, a single pound of which they never actually owned. In making such a demand under the guise of aerial subsidy, it would seem an expensive gesture of respectability to those airlines for up-keep losses. Let us get to the grounding of a number of their Capital-DC-3s in which they had previously been operating with defective and dangerous equipment.

Coca-cola owners have apologized for using "Big Four," admitting that Eastern Air Lines, one of the "Big Four," was never part of the al legation for plane grounding. The owners will still benefit from that accusation of banks like Transcontinental and Western Air, United Air Lines, American Airlines, Northwest Airlines and National Airlines.

▶ **Liners Reorganized**—TWA, United and American will receive \$2 million each over a five-year period to compensate for losses caused when Con stellations were grounded in 1945 and DC-3s in 1947 and the first part of 1948. Exact amount being paid Northwest for the Martin 202 ground ing last year and to National DC-6 grounding losses has not been disclosed.

Aertrans Airlines already has presented that the \$2 million is inadequate to cover its DC-6 grounding losses. It estimates losses at between \$4,735,000 and \$5,752,000.

ALPA Back to NAL

Air Line Pilots Association has returned to the fight zone with National Airlines for the last two or three weeks. Once again, the recently reorganized strike against NAL last November, has triggered over two months of the miners-to-work pact (including the rate of plant construction) kept ALPA personnel out of NAL cockpits until this month.

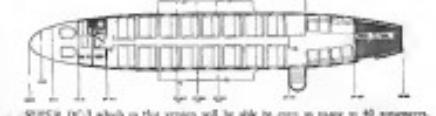
During March, National had 287 pilots as in past, according to ALPA President David L. Schleske. This total included ALPA members who were serving long duty despite their inactive status and non-ALPA pilots hired during the strike.

Schleske had called on CAB to investigate the costs involved at that time, April 1. (AeroPress West, Apr. 9.)

Set with adjustment of the heat processes, National is expected to cut the number of its pilot personnel sharply.



OLYDC-3 gets 18-in. insert (dark tint) on fuselage and with other changes becomes ...



... SUPER DC-3 which in this version will be able to carry as many as 40 passengers.

Super DC-3 to Fly Next Month

SANTA MONICA—Prototype of Douglas Aircraft Co.'s Super DC-3 is expected to fly in May.

Soon after, the replacement for the soon-to-be DC-3 will begin a series of demonstrations. From there, Douglas hopes to develop a growing volume of foreign and domestic sales.

More than 680 DC-3s and C-45s are at operational areas, out of nearly 10,000 originally built. If Douglas can keep even a small fraction of that number, it will write a healthy tomorrow business.

Two prototype Super DC-3s have been delivered to Pan American World Airways and Trans World Airlines, respectively, and the Douglas Santa Monica plant. An Aertrans' White chief recently inspected a Super DC-3's fuselage assembly in which a 14-in. structural assist was made in the fuselage lengthening it for additional passenger space.

► **These Versions**—Douglas has plans for three versions, in accommodations 29, 31, and 40 passengers. Last two versions incorporate a convertible cargo area situated at the front of the cabin. Eight seats can be rapidly folded to provide cargo space for four men.

Takes off gross weight will have to be increased to 28,200 lb. to make use of the 30- and 40-passenger arrangements. That will require installation of auto propeller feathering equipment not needed with the 29-passenger version, which has a takeoff gross of 26,300 lb.

Typical range of 280 and 350 miles are used in revenue census planned by Douglas. One calculation on the 40 passenger version indicates the plane can show a 37% load factor with only 16 passengers, while carrying 3,005 lb. of cargo. Flexibility of cargo conversion design is expected to make the airplane attractive to short haul lines whose passenger loads and cargo requirements vary.

Super DC-3 is expected to cruise around 140 mph, though maximum speed is 210 mph. 150 MPH (Cruise) or Pratt & Whitney R-2000-D5 engines power DC-3, currently equipped with Pratt & Whitney R-1830 engines, running at 196 mph.

► **New Wings-Aerodynamics**, Douglas claims the Super DC-3 will fly satisfactorily. The wing is new from the noselets out. Outer wing panels have squared-off tips, are dual riveted, and in an optional instant, will carry 400 gal additional fuel. Tail surfaces are bent up for increased strength and control.

Fuselage nacelles are fitted with new leading edge enclosures. Revised hydraulic system operating at 1,000 psi, gives greater lifting power, more maneuverability, and the tail will be partially rotated.

Optimum improvements include a pressure door which lets down steps, climb rating 3000 feet and a new load panel metric standard.

► **Server Conversion**—Tow-Douglas is not overlooking prospects of converting

An Avco C-45s to Navy R-6Ds (service counterparts of the DC-3). And the company has also planned plans for conversion of existing DC-3s. Since the C-45s have some structural bleeding at the tail not found in earlier DC-3s, Avco machines are proposed to convert a C-45 to a Super DC-3.

Douglas ground handling techniques for the DC-3, as the name, will still be applied to the new version. True to the company's policy, however, Douglas engineers should help compensate the difference in cruising speed between the Super DC-3 and the speedier postwar fast-cargo transports now used by many major airlines.

Douglas expects its biggest market will be leisure, small airbus and freight audits, where certain dollar shortages seriously put a hamper to really equipment purchases.

The company is prepared to perform conversions on any of four major configurations, with various equipment packages, including either Pratt & Whitney R-2000-D5 engines at 196 mph for Islander or Wright R-1830-C9B engines, rated at 147.5 hp for Islander.

► **Cost-Cut Figures**—For the modernization, costs are based largely on the planes Douglas standardized for All American Aviation, a project similar in scope to aspects to the Super DC-3. The plane cost will vary between \$140,000-\$200,000.

A CAB extension of its safety regulations covering the DC-3 expires at 1973, at which time certain restrictions will be placed on the aircraft.

NAC Reports

New urgency given to research programs by supersonic flights.

"Progress in aerodynamics research during the past year has been more rapid perhaps than in any other year since the Wright Brothers' first powered flight," says the National Advisory Committee for Aeronautics in its annual report for fiscal year 1946.

The Committee's records program during the past year was conducted in an aggressive manner, resulting at a considerable part of the fact that the interest of world has been adequately extended by a special research explore," the report states, and provides assurance that "continued scientific research can provide the engineering knowledge necessary for the design of tactical aircraft to operate at the highest speeds desired."

► **Propulsion Report**—The report contains a detailed outline of research progress in the fields of aerodynamics, aircraft pro-

pulsion, aircraft construction and aircraft operating problems.

AERODYNAMICS

For the very first time that are suitable for high speed flight, removable maximum lift and drag characteristics are now available for both low-speed and supersonic flow. An NACA 64208 airfoil equipped with a drooped nose flap and a plain trailing edge flap was investigated at high Reynolds numbers and low Mach numbers.

These tests indicate that the optimum combination of drooped nose and plain trailing edge flap increased the maximum lift coefficient 14% at constant. Tests show that the upper-surface leading-edge flap, if placed, a mass effect high-lift device than the lower-surface leading-edge flap. Evident type of flap, compared with the corresponding nose flap at high angles of attack.

► **Stress Wings**—Tests on the Army's 10-ft 10-in. wind tunnel show that a wing of the topmost possible aspect ratio with sweepback of 60 or 65 deg is capable of obtaining flight efficiency of Mach numbers up to 3.5. Delta-wing planform studies indicated that the transonic stability problem should be encountered in flight with such a wing at the highest Mach number reached.

Calculations show that at Mach numbers above 2, a sharp, sharp-edged wing configuration is disadvantageous to a sharp wing which is not swept behind the Mach cone. Boundary-layer investigations have employed theoretical predictions of high-lift, low-drag and improved stability with consequent improvement in transonic and flight characteristics of aircraft so equipped.

POWERPLANTS

A study of concepts in the altitude wind tunnel indicates that optimum

propulsion over a wide range of operating conditions requires an adjustable exhaust nozzle area.

An investigation of "hot starts" of turboprop engines indicated that extreme fuel-flow rates of over 200% of normal may be required to overcome fuel starvation and flameout, which can also result in a 50 percent reduction in required start-up energy.

An analysis of a gas-turbine engine indicated propulsive engine rating exhaust gas to jet nozzle indicates that it should be capable of operating with a blade specific fuel consumption of 1.2 lb. per hr. lb. and a specific weight comparable to that of a typical turboprop engine.

AIRCRAFT STRUCTURES

The theory of diagonal tension in flat panels was extended to curved panels as represented by twisted wing skin panels, was examined and a method was developed for determining the theoretical buckling stresses of unattached cylindrical shells under various loading conditions, including attached shells and the particular case of curved rib-tangential panels in axial compression subjected to a centrally located chordwise load.

An investigation of a full-span two-spar 45-deg swept-wing with skin panels in spans stressed that the stress distributions parallel to sweep are constant to that portion of the wing near the leading edge, the stresses in the outer portion being given by the standard formulae for straight wings. Main effect of sweepback on the stresses is due to concentration of normal stress and very little shear in the root zone.

► **Alstom Operating Problems**—A preliminary investigation of the Alstom two-spar 45-degree swept-wing with skin panels in spans stressed that the stress distributions parallel to sweep are constant to that portion of the wing near the leading edge, the stresses in the outer portion being given by the standard formulae for straight wings. Main effect of sweepback on the stresses is due to concentration of normal stress and very little shear in the root zone.



NEWEST FIREFLY FOR FLEET

England's Hawker Firefly Mk. 5 is the latest model in the two-seat seat fighter series being produced by Hawker Aircraft Co., Ltd. Powered by the well-known Firefly Mk. 4 with a 2250-hp. Rolls-Royce Griffon en-

gines, it differs from the old model mainly in internal changes. Although its primary function is day fighting, it can be used for reconnaissance work. Other versions are for night fighting and anti-submarine.

longevity survey of the strength of prob-
lems indicate that a significant solution
to the problem will require that sufficient
metallic materials be made less hazardous,
that greater sources be isolated and
that fuel be separated from potential
ignition sources within the aircraft.

Flight investigations are revealing that
airframe damage, as the load, gage seats
and uptake of a turbine engine causes
a significant problem as an threat.
An investigation of engine damage
prior to separation yields evidence re-
presenting lesser need for concern.

Investigation of use of low-g load
from the turbine to heat the seat de-
mented the need to be practical,
even under severe wing conditions.

Comments were that "although
flight at supersonic speeds is now a
reality, it cannot yet be considered per-
manent," and points out that the B-52 X-
1000's virtually fibrousity as compara-
tive flight. However, acceptability
of supersonic flight is given in
uniform terms in aircraft design [which]
is known to have extended to other countries, and it must be per-
suaded to have a world wide effect." The committee concluded, "Because at
these considerations, the strategic pro-
grams of aerospace research and de-
velopment on problems of high-speed flight
is essential to national security."

Manufacturers' Sales Exceed \$1.2 Billion

Sales volume for the aircraft manu-
facturing industry increased to a post-
war peak of \$1,201,164,228 for calen-
der year 1948, according to an American

Business Survey of government and industry
reports. This compares with an
annual figure of \$1,000,000,000 in 1947
by the Aircraft Industries Association
for 1948.

Ship sales increases for 1948 were
as follows by Boeing, Convair, Curtiss
Wright, Glenn L. Martin Co., and
North American. Five other manu-
facturers reported some increase in
sales. Bell, Commercial, Republic, Ryan
Co. and General Aircraft Corp. Reech
Douglas, Bellanca, Fairchild, Northrop
Piper and Ryan had a decline in sales.

Details of the 15 companies included
in the survey:

- **Bell Aircraft**—Sales volume declined
from \$19,364,000 in 1947 to \$23,700,
000 in 1948.

- **Bell Aircraft**—Sales increased slightly
from \$14,311,000 in 1947 to \$15,329,
000 in 1948.

- **Bellanca Aircraft Corp.**—Sales were
down from \$1,160,000 in 1947 to
\$1,076,000 in 1948.

- **Bering Airplane**—Sales shot down
\$18,000,000 in 1947 to \$173,347,000
in 1948.

- **Cessna Aircraft**—Sales doubled from
\$7,511,000 in 1947 to \$15,957,000 in
1948.

- **Consolidated Vultee**—Sales increased
from \$47,924,000 in 1947 to \$102,352,
000 in 1948.

- **Curtiss-Wright**—Sales jumped from
\$8,518,000 in 1947 to \$11,747,037
in 1948.

- **Douglas Aircraft**—Sales dropped from
\$123,450,000 in 1947 to \$114,582,000
in 1948.

- **Eduard**—Sales declined from
\$16,900 in 1947 to \$10,073,075 in
1948.

► **Grumman**—Sales rose from \$24,140,
000 in 1947 to \$41,200,000 in 1948.

- **Lockheed**—Sales dropped from \$134,
000 in 1947 to \$125,000,000 in 1948.

- **Glen L. Martin**—Sales jumped from
\$23,957,000 in 1947 to \$26,500,000
in 1948.

- **North American**—Sales increased
from \$22,865,000 in 1947 to \$11,678,
000 in 1948.

- **Piper Aircraft**—Sales declined from
\$1,480,000 in 1947 to \$3,941,000 in
1948.

- **Republic Aviation**—Sales increased
from \$18,200,000 in 1947 to \$50,976,
000 in 1948.

- **Ryan**—Sales leveled off from \$8,200,
000 in 1947 to \$5,000,000 in 1948.

- **United Aircraft**—Sales increased
slightly from \$208,379,000 in 1947 to
\$210,275,749 in 1948.

NWA Seeks RFC

Help on Financing

Northwest Airlines has asked the Re-
construction Finance Corp. to help
with its pending capital obligations.
This is necessary by the failure of its
holders to supply the necessary finan-
cial accommodations.

In 1947, Northwest arranged a credit
agreement with twenty-one banks, headed
by the Boston Trust Co. of New York City,
covering a maximum of \$16 mil-
lion. Now \$9 million is outstanding.
The maximum amount of the credit
was \$10,000,000, but was committed
upon advance of the first of 10 B-52s
Sheldene by that date. Delay in
delivery caused the banks to insist
the loan beyond that date and also
gives them the right to demand payment
of the advances now outstanding.

► **RFCA**—Lessees—Pending RFC arra-
ngement provides for a total credit of \$21 million.
More details provide for RFC advancing a total of \$12 million,
with the banks extending the existing
\$7 million loan.

The RFC loan will be secured by a
mortgage on flight equipment and per-
haps other assets of the company. Interest
rate will be 4 percent annually, and
loan will be repayable at the rate of
5% after four years.

Among other things, dividends on
the preference shares will be payable
only out of earnings developed after
Mar. 31, 1949. With Northwest con-
tinuing deficit operations, financial
sources question whether the regular
quarterly dividends due May 31 can be
paid under this provision.

Since RFC's participation would create
a new equity interest, agreement
with stockholders must be obtained at
the annual meeting on Apr. 24, 1949.

AVIATION WEEK, April 18, 1949

Problems of New Transports

SAE meeting panel decides there is nothing wrong that
education and training cannot correct.

Panel concerned with the problem of
cabin refrigeration on the ground took
up the problem of "Getting the
heat out of our new transports." The
topic education and training.

The older aircraft at the Society of
Aeronautical Engineers' Aerospace and Air Transport meeting brought out
clearly that the majority of current op-
erational and maintenance difficulties in
passenger transport aircraft are products
of lack of information and experience
with the complex and difficult new
equipment now going into use. The
meeting held in the Hotel New Yorker
in New York City, consisted of a series of
education and application papers on
various subjects such as insulation, en-
gines, propellers and auxiliary equipment
while the passengers behind them
sat in comfort.

► **Reynold's Aircraft**—The problem of
getting the most out of our aircraft
parts was summed up by Douglas vice
president Arthur E. Reynolds. The
new transports represent a substantial
improvement in utility and perfor-
mance which has been obtained in a com-
paratively simple manner. They are extremely
complex devices in comparison with their predecessors. Since
they can do a number of things which
formerly could not be done, one must take
into account the fact that they have
been built to standards far exceeding
those of old aircraft. In addition, the
new aircraft are designed to do more than
the old aircraft ever did. So if the airlines
are to be operated to the limit of their capa-
bility, they must be beyond. It is necessary
that the operating personnel become in-
tensely acquainted with them.

The rapid development of electronic
instruments, fully automatic control
equipment such as air conditioning equip-
ment, propeller pitch control, servos and
other electrical and hydraulic controls
has considerably simplified the modern aircraft.
Many of these devices either can semi-
automatically regulate and automatically
select which provide extremely close
control over the system they monitor.
But these controls are so intricate and
often become actual when turned
when improperly adjusted or mis-
used.

Lack of coordination between ship
specifications, equipment designer
and the airline often leads to the fact
of the extreme "overdesign" period
now accepted as unavoidable in the initial
use of new equipment.

The panel concluded:

- **Cables**—Cantling Airlines have long

led edge and equipment for the production
of fuel which would permit a 10 per-
cent increase in power or a 15 percent
increase in economy, but the market
demanded for lower fuel costs, with less
aircraft and automobiles, pushed the
production of these fuels at reasonable
cost.

Meanwhile, fuel savings of 10-15 per-
cent are available through the simple
expedient of using two different fuel
grades in the engine, a high-octane
fuel for takeoff and maximum power,
and a moderate octane fuel for cruising.
Sikorsky has been using this sys-
tem for many years and has shown a
total cost saving of 6 percent already.

The panel also developed the theory
that the flight control deck and the
passenger cabin must be treated as two
separate air conditioning problems.
Cabin area on modern transports
are poorly ventilated and heated, work
area is well ventilated and heated. Flight
deck area must be well insulated and
heated while the passengers behind them
sit in comfort.

► **Electrical Systems**—Aircraft electrical
systems are usually unperfected against
overloading, single generator failure [an
along as total airplane power failure
because of the fire has irreversibly
burning of cable bushes from a single
cable failure, etc.]

Airplane auxiliary electrical systems
should provide separate loads from
each generator with differential control
or balanced current protection should
either fail, and grouping into sub-systems
and well insulated to protect the use of 120
volts, 60 Hz, 480 volt, 400 Hz AC
current.

► **Props**—The propulsive industry has
had available for five years the broad



NEW MARTIN DESIGN

latest innovation of the Glenn L. Martin Co.,
the midship version of the XE-4. Two
experimental models of the XE-4, powered
by six GE-Airflow 345 turboprop engines,
have been delivered to KLM. Much is
now being done to interest the Air Force in
the XE-4.

Improving version of the big bombers to in-
crease range at the cost of a relatively
small penalty in speed. Four Allison 501
and 510 turboprops would probably be used
if the Martin proposal is developed by the
Air Force.

New three-passenger Bell 421 transports
will be produced under the 121-000
Fleet Master program model to be produced
by Bell Aircraft Corp. It not only will out-
perform, but will sell for almost half the
price of its predecessor, the twin-place 420.
Six of the new craft already have been or-

HEADLINE NEWS

HEADLINE NEWS

Securities Control Again an Issue

Financial difficulties of airlines strengthen CAB's hand in plea for power over capital structures.

Control over issuance of securities and the composition of capital structures for airlines is due for renewed consideration.

The Civil Aeronautics Board has long sought the right to pose restrictions on financing while the industry is consistently profitable. Present dollar values of a majority of air carriers now appear to have strengthened the Board's hand.

This question may figure prominently in the pending reorganization of airline finance by the Senate Committee on Interstate and Foreign Commerce, as indicated by recent testimony of CAB Vice Chairman Gerald Ryan before that group. In reviewing industry objections to security regulation, Ryan also revealed an interesting sidelight on TWA.

► **TWA, PFD**—The CAB spokesman declared that a financing program for TWA involving \$100 million would have provided the carrier with enough the groundings and the pilot's strike in the international field without incapacitation. This plan comprised a capital structure consisting of about 25 percent debt and 65 percent equity capital.

Said Ryan: "This financing plan did not get through, and they managed to debt up to \$100 at the same time. I think today TWA has a capital structure at which the equity has entirely disappeared and the debt appears around 135 percent or something like that."

"Chicago & Southern presented on an equity financing basis, and while it did not trouble little, it was able to ride out the terrible American series to equity financing and American last terribly during the past two years, but has been able to raise the less without any critical attention developing by reason of the fact that it did have that great cushion of equity capital."

The CAB would have required there to issue equity stock because there was plenty of equity available to be required at first time. These carriers would not have their present capital structure had we had the power to tell them they had to have a different kind of capital structure."

vated CAB with a pointed argument for importance of another act of authority over the industry.

Observers may question whether CAB could have developed sound capital structures among air carriers if it had never had power over capital structures. Some may point in reproach of the current rate patterns and to the fact that the Board may have shared industry opinions in making awards which today provide wasteful competition and incentive at heavy subsidy payments.

By effectively sanctifying a capital structure through the authorization of the issuance of new securities by the Board, by its action, would supply that sufficient legal power might be forthcoming to support the function of the carrier authority.

► **A. Parikh**—This element is actually passed in the CAB's present relationship with the Reconstruction Finance Corp. in authorizing government loans to air carriers. CAB is required to certify to RFC that the applicant can discharge its obligations without benefit of a federal guarantee, before RFC can make the loan. This requires some extreme prearranged conditions.

For example, in one case CAB insisted an issuer make possible the amendment of National Airlines' 30-year lease of the Boeing model certification parameter RPC to obtain \$175,000 so Northwest, for engine equipment purchases. Under existing legislation it is questionable if the Board could have acted otherwise. By withholding such compensation, CAB conceivably can force a carrier out of business, but this may involve legal issues which would take a long time to be resolved.

► **Earnings Conditions**—In viewing airline finances, balanced capital structures are important. The industry has been forced to subordinate itself with regard of administration and cost control. It may be required to make further concessions before the TWA capital structure becomes reasonable.

TWA's current position is reflected in the gain in net working capital increasing to \$10,360,689 on Dec. 31, 1948, compared with \$7,477,413 a year earlier. Depreciation charges, if carried as reported, should easily cover the adjustments due this year on the company's debt. Monthly payments to appear against the separation of the two companies were \$1,713,301 during 1949. Fullerton bank packages, a debt of \$12,913,201 will remain against the company's equipment and main shield of the debtors created by the Equitable.

► **Argument for Control**—It is ironic that Equitable, an outside adviser of two local citizens, though its influence in airline finance has gen-

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Perry & Whitney Engin

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ON U.S.
AIR LANES—

Flying Horsepower



ENGINEERING



Korer Vertiplane.

New Russian Aircraft Revealed

While large helicopter and a trainer show influence of Western design, a small copter has development history dating from 1928.

Information on their new Russian military aircraft has been gained from leading Soviet sources. From independent reports in Western Europe, America, and Russia, has obtained the first authentic representations of these planes, together with all presently available details.

To the east, a large copter and a trainer, respectively, the work of two well-known Russian designers—Boriskin and Yakovlev. The other, a rotary-wing craft combining a quasi framework on platforms, is the creation of Kornev, a designer not previously known in the West.

► **Boriskin Helicopter.**—The introduction of this machine is a continuation of a tradition that the Soviet Union is basic to the construction of large, passenger carrying copters.

Showing from design and leaded by Professor Ioss P. Boriskin, the

craft exhibits enough evidence that Russia is following the road set by America and followed by Great Britain.

The new copter appears to be a scaling up version of the two-seat Orizaga, which was shown publicly in 1944-45 at the Moscow Aviation Day display. It is likely that the new craft features similar construction, although the main day sun built of metal tubing and wood, with fabric covering.

Accommodation in the passenger cabin cockpit are reported to be fair in view of two in the nose.

Third-bladed counter-rotating major rotor blades with three smaller blades mounted on lower star wings. The main rotor has probably a diameter of the 600 hp plus ASH 21 models.

Landing gear is of single landing, with long carbon fixed.

It is presumed that the smaller Orizaga was used to prove certain de-

tails included in the new copter. ► **Boriskin Background.**—Pavel Boriskin, has had extensive experience in the field of rotary-wing aircraft. He has been engaged in this activity for the past 15 yr or more. His work includes the S-1A of 1934, an experimental helicopter incorporating the unusual feature of two sets of three-bladed rotors of different diameters.

Some experience for the new helicopter may have been gained from a captured German Focke-Achgelis FA 223. During World War II, several such, taken to Moscow, in 1944.

An example of this German copter was sent to both the U.S. and England at the same time. British "scrub off" the FA 223 after very few hours of test flying.

Prince and, soon, severely. Gasolina, have both produced version's of the FA 223.



Borsig helicopter (above), and Yak-11 (below).



► **Kornev Copter.**—The designation for his craft, "Vertiplane," comes from the name given to the designer of this craft, N. T. Kornev. This is his first "true" helicopter, "second flight." The term initially was used in 1928 when it was adopted to describe the first successful Russian gyroplane, the KASKR I.

The Kornev Vertiplane design departs

markedly from the model indicated by the large Boriskin helicopter. It is extrinsically simple that it appears almost in elementary configuration.

Powered appears to be a two-cylinder, no-cooled east converted through a series of gears to connect, three-bladed rotor.

The position stability is unusual in Soviet design, and spot from the obvious water-cooled motor may have been adopted to reduce the apparent overall simplicity.

► **Kornev.**—Background.—Helicopters and gyroplanes have been the special concern of the designer of this craft, N. T. Kornev. He is best known for his gyroplane, the KASKR I, a collaboration with N. K. Rostislavov that two construct making up the type name, KASKR I. This was followed by the KASKR II.

After some five years, the next design resembled to Kornev apparatus—a two-cylinder, no-cooled engine driving the A7-3A shaft in small gear ratio, these coils were adopted for forestry and survey work in the Far East, and at present in 1945, were still in use.

► **Yak-11.**—This new craft appears to be the Soviet version of the North American T-6, both of which were rugged single-seat land-based.

The plane is being delivered to the Red Air Force as an advanced trainer and aerobatic type to the single-seat, piston-engined fighters.

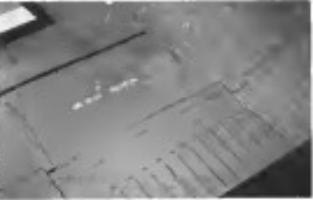
► **Yak-11.**—Initial deliveries, the Yak-11 version train made a departure from the trend of advanced designs of Russian Lt. Gen. Aleksandr Sergeevich Yakovlev.

The earlier UT-1 UT-2, and Yak-11 have been light aircraft. These have been powered by model engines ranging from 150 to 170 hp., whereas the new Yak-11 has the more powerful ASH-31 radial.

By American standards, the craft appears slow, and has poor visibility and a nearly useless powerplant. Landing gear is monoplane.

► **Yak-11.**—This new craft appears to be the Soviet version of the North American T-6, both of which were rugged single-seat land-based.

The plane is being delivered to the Red Air Force, in 1945.



Spoiler on McDonnell Douglas F/A-18 Hornet. Below: Close-up of aileron. At right: A sketch to explain ailerons.

Spoiler Ups Aileron Effectiveness

A development by Glenn L. Martin and Boeing to maximize aileron effectiveness is being used as part of the company's military aircraft—the A-1, Harrier (introduced above), PGM Marauder, X-24B and T-53A.

It is a spoiler installation which complements the normal aileron to afford quick roll for cruise action.

Current high-speed aircraft design incorporating smaller, thinner wings makes necessary the use of large span flaps to hold landing speed to a reasonable value. And larger flap drag induction in aileron operation, with its resultant slow roll, is a fact of life.

To cope with this problem, Martin engineers devised a plan to operate a spoiler to distract the flow over the top of the wing to affect maneuverability of the plane.

The spoiler is located on top of each wing, just ahead of the flap and close to the latter's outboard end. It is slanted to the adjacent aileron and is operated automatically by a hydraulic cylinder when the aileron functions.

That, at normal level flight, the spoiler is raised, forces the air to separate, but when the aileron is used, the spoiler moves in synchronism and in a proportionate degree, breaking the flow over the upper surface of the wing to afford greater maneuverability.

It's reported that the spoiler may be as much as three times as effective as the conventional aileron, gives the same rate.

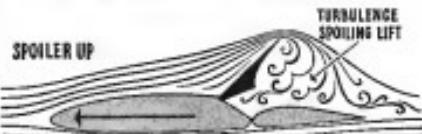
Theoretically it is considered possible to eliminate the aileron and control the day to wing's full length, using a spoiler aileron as sole lateral control.

In the present installation, to cope with an emergency in event of power failure and after aerodynamics sensing of the lateral control system for pilot at least a small "feel" aileron is provided.

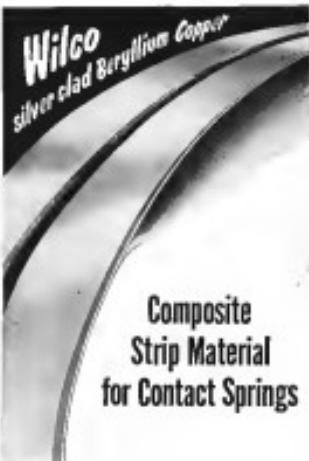
NORMAL FLIGHT



SPOILER UP



Top sketch shows spoiler lowered back with wing contour for normal flight. Bottom sketch shows the wing's upper surface when spoiler is extended. Center diagram indicates location and position of aileron.



WILCO SILVER CLAD BERYLLIUM COPPER is one of the newer WILCO materials developed and produced to reduce friction problems in contact spring assemblies.

PREFERRED . . . because 1. It is comprised of a silver contact surface permanently bonded to beryllium copper which can be heat-treated in the correct manner to bring out the required spring properties.

2. It increases the permissible current and electrical load.

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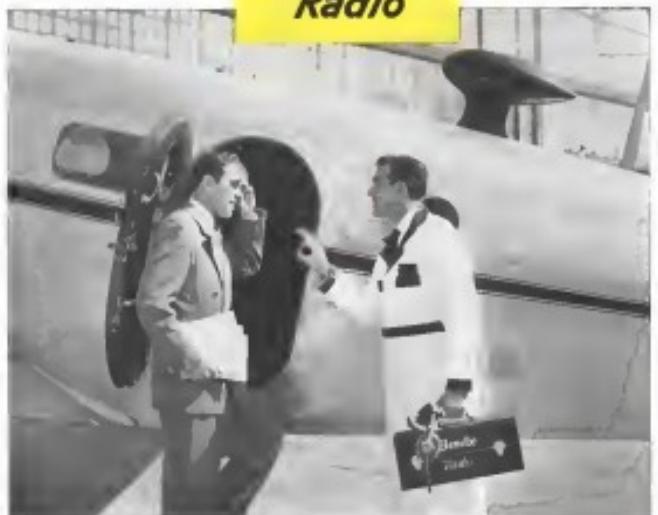
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Research Narrows Boundary Control Use

Early promise failing to materialize. Additional research desirable.

The improvement in wing efficiency through removal of air from the boundary layer often substantiates advantages to relatively low-speed, long-range aircraft. But in many other applications no effects are not yet clearly understood.

In a comprehensive status report, Albert E. Von Doenhoff and Lawrence K. Loftin, Jr., research engineers at the National Advisory Committee for Aeronautics, presented at the recent 17th Annual Meeting of the Institute of the Aerospace Sciences, talk based on present data, boundary-layer control can produce substantial improvements only as wing loading is increased up to perhaps 12 or 13 and a thickness ratio greater than 20 percent.

► **Cross-Wingflow.** Within this range of applications, however, which embraces strategic bombers and long-range passenger/cargo planes, the gains are extremely attractive, according to a 50 percent increase in lift with a 10 percent chord reduction in L/D ratio over present rates.

To attain maximum gain it is made possible to reduce the chord length of upper surfaces as high as 20-25, which are discussed structurally practicable by simultaneously decreasing the rate of rise of thickness ratio as high as 40 percent.

In the past, high aspect ratios have been obtained only through the use of extremely thick root sections to provide the necessary span depth. These thick root sections often cause flow separation throughout this range of flexible lift coefficients, resulting in increased profile drag values and consequent degradation in the overall L/D ratio of the aircraft.

In such designs, this gain in profile drag in the root section approaches closely the loss in reduced drag created by the use of high aspect ratio.

► **Thick Wing Investigations.** NACA is now completing a study of several thick wing sections (28, 32 and 48 percent) using suction to prevent separation. Preliminary results are shown in Fig. 1.

These data show that optimum aspect ratio for maximum L/D is in excess from 11 to 20 by the use of boundary-layer control with an accompanying increase in L/D of approximately 15 percent.

Although the lift of the wing with boundary-layer control is higher than that of a wing without such control, the value of the profile drag coefficient at minimum L/D is greater for the wing with boundary-layer control due

to the presence of the surface discontinuity.

If the effect of the discontinuity is added to the glaze area and its load compared with the boundary-layer control wing, the latter shows up even more favorably, exhibiting an improvement in L/D ratio of 10 percent.

But this gain is applicable only to comparatively low-speed aircraft, as seen in the fact that the critical Mach number for the 48 percent section, as used in the tests, is only 0.450, at about 500 mph, above 34,000 ft. This speed could be increased, however, through an adequate amount of wing sweep.

► **Boundary Layer Control.** Reductions in profile drag obtained by the use of boundary-layer control have as its theoretical ability to extend the region of laminar flow all the way to the vicinity of the suction slot point. The well-known work of Fred Spalart Goldstein, as outlined in his 1936 Wright Brothers Lecture at the Institute of the Aerospace Sciences, is predicated on the preservation of laminar flow, extended to the 70 percent chord point. The laminar NACA low-speed profiles of sections designed for a laminar boundary layer extend to the 90-95 percent chord point. In actual practice, however, NACA profiles indicate laminar flow only to the 15-20 percent chord mark because of manufacturing tolerances, waviness, film flow, etc. It is thus apparent that much laboratory results are not yet applicable to actual combat craft.

This situation is aggravated by the fact that boundary-layer control configurations are not necessarily unique in surface irregularities than plain laminar flow. Since it is apparently as yet impossible to determine the exact geometry and field laws for guidance and design of profile slot wings as with a smooth flat plate, laminar flow can be maintained only at the expense of some additional drag because of the slot slightly with a low-speed produced momentary change in the slot angle. To affect appreciably the maximum Reynolds number at which laminar flow could be obtained over the slot, slot width was 0.005 in., slot spacing 0.75 in.

These same areas of total induced drag laminar flow could be obtained over substantially the entire upper surface at a maximum Reynolds number of 10⁴-10⁵, but over the lower surface only to a maximum Reynolds number of 5.5±10³, despite the fact that the airflow was streamlined. The obvious reason lie in secondary irregularities in the lower surface and an assumption is needed that these were so slight as to be noticeable only with the aid

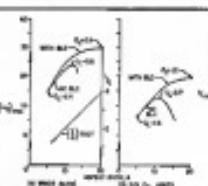
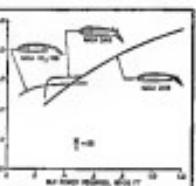


Fig. 1 Effect on $(L/D)_m$ of run trailing edge thicknesses on deck root surface of high aspect ratio wings with leading edge singularity. Fig. 2 Effect on minimum lift coefficient of boundary layer control by suction and bleeding.



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ENGINEERING

of a powerful magnifying glass. It is thus apparent that use of surface ribs to increase the possible extent of boundary flow does not appear to be very attractive.

► **Moving Lift Coefficient**—In addition to its primary role as a drag reducing device, boundary layer control has also claimed attention as a means of increasing the airfoil's lift coefficient. This may be accomplished by removing a portion of the free-stream air in the boundary layer or by creating high energy air within the boundary layer.

Relative advantage of these two options depends upon the amount of stored power required in terms of the lift coefficient increase that results.

Fig. 2 illustrates this by showing clearly that, whereas Boeing produces extremely high lift coefficients, it requires proportionately high expenditure of stored power.

It will be noted that slotted and double-slotted lips are used in these configurations, since it has been determined that not only do such high lift devices provide greatly increased values of maximum lift coefficient in combination with boundary layer control but they also reduce inherently the angle of attack at which maximum lift coefficient is obtained.

It should also be noted that these are 15 percent optimum. Generally, these results are attained by variation in thickness and reinforced by the use of local thickness steps.

► **Application to Sweep-Wing**—Boundary layer control is receiving considerable attention at the moment as a possible solution to the problem of high-speed aircraft using thin, sweep wings with accompanying low lift and poor stability characteristics.

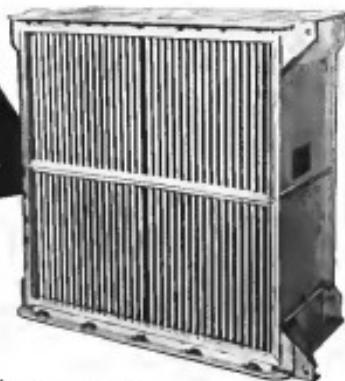
Theoretically, at least, these characteristics result from the spacious flow of the boundary layer towards the trailing edge where the boundary layer is at the tip region and pressure is maximum upstream. Thus, the sweep wing has an inherent form of boundary layer control. Unfortunately, there is no data available on the application of boundary layer control to swept wings, but the first stage in attempting to improve the low speed characteristics of swept wings should be the duty of leading edge augmentation on the upstream portion of the wing, and research is highly desirable.

► **For Lateral Control**—Boundary layer control has been outside the use of boundary layer control in a lateral control device through its ability to change the lift coefficient of a wing. This is achieved by the lift over one wing panel while decreasing it over the other, an action which could be provided. One of the major advantages of such an application is that control forces could be reduced to extremely low values.

(Continued on page 28)

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AVIATION WEEK, April 18, 1949

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Born and Branded in Texas

There's a new brand in Texas—the "Flying V" of Chance Vought Aircraft. It is being applied this month to the first F4U-5 "Corsair" to be built entirely in Chance Vought's new Dallas Plant.

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Jet-Thrust Vertical Takeoff Under Study

Model craft with pulse jet tested on whirl arm.
Plane specs prepared.

Piloting the feasibility of a military jet airplane which would need no run way for takeoff and landing, United Electronics, Inc., Palo Alto, Calif., has conceived several model tests of such a configuration.

Stanley Biles, Jr., UEL president, has prepared specifications for a full scale prototype of such an aircraft. It would make a primary vertical ascent and then have a "canard" attitude for high altitude flight on the support of side wings. Landing would be effected by a brief surface climb followed by tail-first descent on the erosion of the jet.

The armed services have reported the young designer's test for a prototype development contract. However, Aviation Week has learned what is believed to be reliable information that the basic concept of this type of craft is receiving serious study and that a design comparable to Biles' may be under development by a major aircraft company.

► **Model Details.**—While the idea of an aircraft taking off in vertical altitude, employing a hot air propellant gas, is not unique with Biles, he probably has not strayed before now the extensive scale model testing conducted by United Electronics.

In previous experiments, a lightweight, all-metal model powered by a canard pulse-jet engine, was able to rise to 100 feet within 10 seconds. Eight more models are planned by mobile deflection plates (acting as a "steering" or horizontal flight) centered in the jet stream.

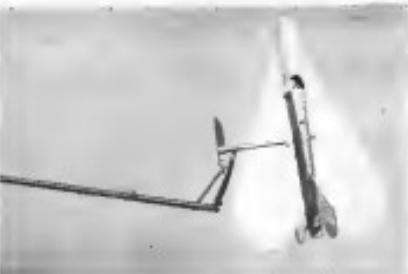
In the process of the test, each model was restrained by the whirl arm at all times; no rudder control was employed.

Modern portion of the tests show a model transitioning from horizontal flight under remote control, and finally a return to vertical landing and pre-pilot descent.

Biles told Aviation Week that his interest in the design stemmed from previous experiments with a "canard cockpit"—an aircraft using a central helicopter rotor system for vertical thrust and counteracting to forward aircraft flight by tilting the nose up during low speed flight.

Although scale models were developed at UEL, mechanical complexity precluded further interest.

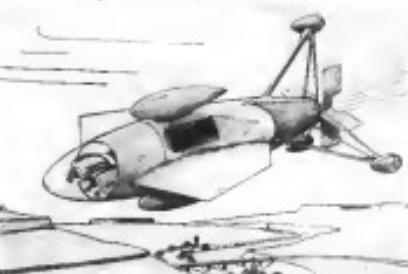
► **Foldable Design.**—Referring to his



Proposed model on balanced whirl arm in vertical takeoff test



Experimental canard-cockpit model on whirl arm



Artist's conception of United Electronics design for vertical flight aircraft



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design for a full-scale orbital missile jet, Hiller analyzes the proposed aircraft in flight.

The proposed unit will be powered by J-300 Pratt & Whitney plus liquid rocket for boosted takeoff with full nose load. Qualified for a crew of two, in prone position during horizontal flight, one in the plastic seat of the cockpit, and the other seated in the rear, the flight deck provides maximum visibility.

The aircraft is based on the fuselage behind the pointy cockpit fairing and provision is made for pitot-static, control, fuel tanks. The rapid landing gear is of fixed design, applied drag being considered the lesser evil in conserving the weight penalty of a retractable landing gear system.

Critical surfaces are arranged to operate in the jet stream and also in the center air stream when the aircraft is flying in a horizontal plane.

From advantage of such a configuration it is hoped to never result in a desired point of a sharp change and be able to fly straight in rest upon the terrain by itself.

Immediately after takeoff, with full power of the turboprop and starting rockets, the aircraft is forced into a power position and brought to a forward nose social speed where the wing wings will begin to support all liquid rockets that are turned off and turbine thrust reduced for entering.

"Upon completion of fueling, the pilot slows the craft to a point just above flying speed, and ascends into a vertical climb with a rapidly decreasing forward speed. As the aircraft continues to ascend, the nose will continue power to the forward propellers, the craft is slowed at a rate sufficiently slow that most of the waste in the jet stream is not concerned.

"Model tests have established conclusively that within acceptable ranges the set cruise control is thoroughly practical."

Weight Calculator Offered for Sheet

Improved calculator for determining overall weight of various sheet metal parts is offered free by Davison Metal Co., 205 W. 3rd Street, Los Angeles 7, Calif., upon request or enclosing letter, typed. In addition to its application to sheet, calculators are provided for aluminum, copper, brass, lead, tin. Davison previously designed for calculating weights of various sheets in connection with stamping die plates and quickly gives correct overall weight when widths of strip and paths of part or number of passes required per each or foot, are known.

AVIATION WEEK April 18, 1949

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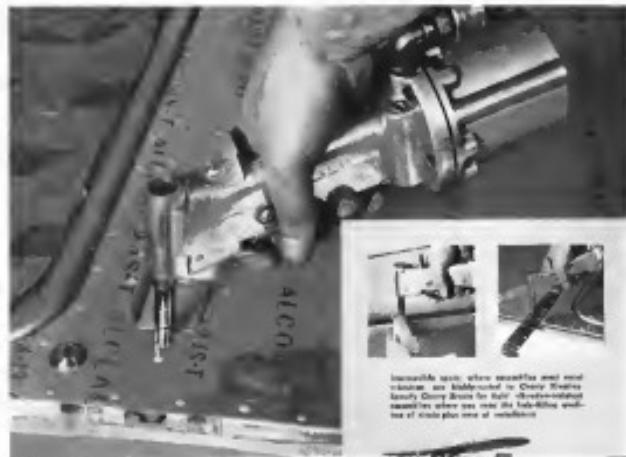
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32 ENGINEERING



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AVIATION WEEK April 18, 1949

33

Air Force Clarifies Research Objectives

A new regulation aimed at defining Air Force research and development authority for year has been approved by Air Force Chief of Staff General Frank S. Vandenberg.

The ruling clarifies major research objectives, gives increased research freedom and sufficiency credit to individual scientists and promotes expanded living conditions and career prospects to prevent associated with the program.

The policy has been under consider-

ation since early last summer and represents continued operation of Air Force research programs and leading civilian systems. USAF regulation 800 R is the first policy statement establishing comprehensive objectives in the conduct of Air Force research defined as the "fundamental investigation of all phenomena where the discovery or application of science to science may be expected."

• **Missions**—It states that the mission of Air Force research activities "is to perform or sponsor the necessary studies and experiments to insure timely improvements in concepts, techniques,

and material for personnel selection, training, management, planning, operation, intelligence, engineering development, production, supply and maintenance by application of the best scientific knowledge, personnel and facilities to specific problems and processes."

New regulation will govern all Air Force organizations engaged in applied basic or background research in detail.

• **Background Research**—An analysis of all knowledge available to insure that areas of greatest military value are developed and that basic and applied research are guided onto the most productive channels. The regulation warns that in background research the potential impact of a proposed weapon system on the survival capacity should be weighed carefully to determine the weapon's ultimate worth.

• **Basic Research**—Fundamental studies to provide new factual knowledge which gives promise of contributing to new concepts, techniques, and methods of value to the Air Force.

• **Applied Research**—Application of scientific personnel, facilities, and knowledge to specific problems which meet basic mission requirements to determine a definite solution at the point of development of these problems.

The three fields of research are aimed at developing specific instruments or weapons which give the greatest advantage with the least weight being technical responsibility of the Air Force.

Funds to support research activities will be allocated so that increased research potential is made possible. Allocation of funds will be determined by factors available for development or production. Budget priorities will support research as promising areas in addition to research for the solution of particular problems.

Regulation establishes the following Air Force policy regarding research personnel, both civilian and military. Careful administration of assignments to insure a maximum career for highly trained personnel; encouraging maximum possible utilization of scientific and technical ideas; having administrative, technical, or administrative burden, encouragement of professional advancement through promotion, education, a fellowship program, and participation in scientific gatherings, and promoting of individual job satisfaction by utilizing special talents.

It also provides to identify methods for hiring consultants and for letting contracts or subcontract for research and states that all research efforts will be at other government departments and universities will be eligible to a maximum.

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Mr. L. R. Kowalek, Chief Engineer,
Trans World Airlines



WE RECENTLY asked Trans World Airlines what they considered important features of Edison Fire Detection. In their answer, Mr. L. R. Kowalek, Chief Engineer, states that TWA's Edison-equipped DC-9's and Boeing Stratoliners have now flown millions of miles without a single false engine fire warning.

An impressive record, but not unusual for the Edison Fire Detection System. It is also probably an important reason why the Edison System is used on every major U.S. airline, and why it has been approved by the U.S. Air Force for all aircraft engine installations.



"... Ed... Mr. Kowalek's letter detailing TWA's success in using Edison Fire Detection will gladly see us copy it."

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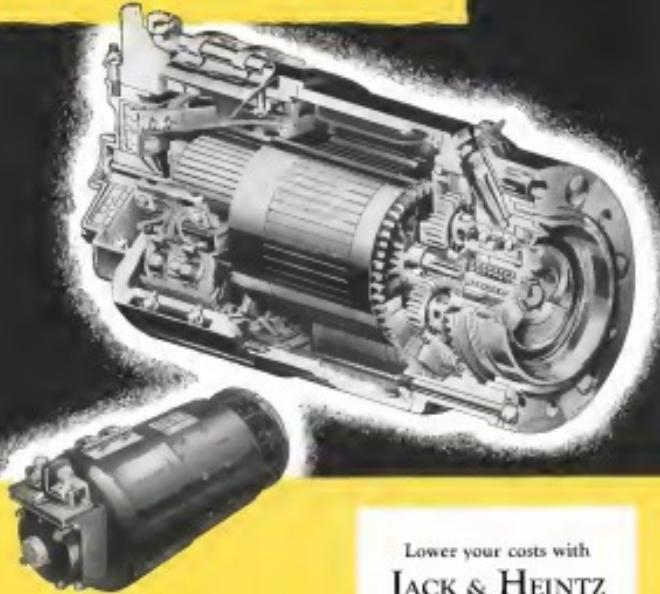
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The new pulley shearing slide, manufactured from powder metal by Stearns Tool Co., Kinston, West Spring, N.C., holds pins on work, and yet makes it possible to lock pulleys, allowing operators to use both hands for pulling operations. Maximum pin capacity on outside banks is 54 in., and pins are interchangeable. Shearing distance is 24 in. Weight is 10 lb. Each shearing device, shears 100 lbs. Total is forged with two sets of slots allowing pins to be moved closer to center for better grasping power on small pins. Pulley may be held in screw type or combination of arms and bushes bushes. Circular plate attachment is available to adapt pulley for use as water pump and generator pulleys, tipped fiber glass, and other materials where pull-off action from outside might cause damage.



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Applicable for lifting, pushing, pulling, etc., and used primarily at airport terminals, airports, and other locations where porters are often required. Manufactured by Underwood Corp., 1501 Avenue, New York 16, N.Y., it is intended to provide better and more multi-copy work with less physical effort by operator. Unit consists fully electric standard keyboard for speed and uniformity of type impressions with integrated automatic features for simplified machine manufacturing operations. It is equipped with automatic carriage return, carriage return, carriage return, carriage return, full length tabulator bar, tabular left to right hand carriage, and pulse selector for rapid selection of column position. Delays during carriage motions, forest, carriage has transparent cutting knife to permit an undisturbed insertion of loose forms, and is equipped with floating bracket plate for sheet carbon paper. Ball carbon paper bracket plates are also available.



Radio Terminal Connectors

To meet need for quick disconnection in radio chassis, wall or tank mounting resistances, Cessna Electric Development Co., 1209 Household St., Los Angeles 31, Calif., has developed new series of miniature designated "RTC." Advertisers are stated to include low separation force, capability of mounting on chassis, interconnection being provided in receptacle section, provision to plug sections for being driven when to plug after soldering to receptacles, and types of terminals are designed for high strength and light weight. Plug shells are phenolic, also serving as insulation, with metal parts bonded to them, clamp, and contact. Series is available in five different sizes and styles having 12, 18, 24, 32, 36 complements of contacts for 15 and 20 watt. Mechanical spacing is 0.75 inches in $\frac{1}{4}$ in. width with maximum loadover of 2500 lbs. and recommended torque of 5 millinewton.



Regulated Power Supply

Designed to supply direct current for publications, laboratory testing of insulation, solenoids, and other aircraft electrical components, new model unit is made by Melchior Electronic Research Co., Inc., Rochester 2, N.Y. Feature is automatic voltage control which holds dc voltage exactly at preset value, regardless of line voltage fluctuations or variation in the dc load. To obtain consistently reliable test results, high frequency oscillations are used to provide high efficiency and to develop long life with minimum of maintenance. Unit operates from 120 ac and delivers 100 amp d.c. Output voltage can be set and maintained with 0.5 volt, anywhere within range from 0 to 150 v d.c. Rectification is of three-phase, full-wave type, providing smooth output voltage wave shape without waveform distortion.



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Especially applicable to servo systems used in aircraft, especially helicopters, radio direction finding equipment, automatic pilots, searchlight drives, for control computers and various laboratory devices, new ac servo motor developed by Kollmuss Instrumentation division of Square D Co., 88-95 9th Ave., Elmhurst, New York, affords combination of high torque and speed, low inertia, small size and light weight. Unit is

PRODUCTION

West Coast Report—

Six Firms Have 69% of Business

While western plants dominate military airframe orders, eastern companies still control engine manufacture.

West Coast airframe companies today announced more than three-quarters of the dollar value of U.S. military aircraft orders, an American West survey shows. Future contracts may be expected to strengthen their position.

Latest available figures show that Boeing, North American, Lockheed, Douglas, Northrop, and Consolidated Vultee have received over \$1,446,000,000 in new orders since July 1, 1948, new orders valued at \$1,176,485,308 for 1949.

The remaining 69 percent of the dollar value of all orders, and 62 percent of aircraft contracted.

Eastern interests—Republic, Fairchild, Convair, Cessna, Sikorsky, McDonnell, Chase-Wright and Bell received \$584,111,000 worth of orders for 1948.

At the time of compilation these totals did not include any contract shifts during the past month.

► **Employment.** Figures—Poston, in military aircraft, reflected also by employees in the western plants, which had 109,450 workers in January, Jan. 1, compared to a national total employment of 165,087 in defense industries, excluding engine and propeller manufacturers. Slightly more than one-half of western defense employment is concentrated in four plants in the Los Angeles area.

An production increases western plants can be happening to absorb some idle floor space. As of Jan. 1 the west's aircraft manufacturing capacity had a use of 75,586,000 sq ft of factory space, including Convair's Ft. Worth, Tex., plant and Boeing's at Wichita, Kan.

► **Boeing.** Leads—Revenues of 1948 influence only sales shown Boeing to be the industry's leader at \$1,176,485,308, followed closely by other western concern companies—Lockheed, \$1,258,328,700; Douglas, \$112,481,487; and Convair, \$112,351,524.

Two eastern companies topped the \$100 million mark in sales, but both were recently merged and now do business as Helo Corp.—They are United Aircraft Corp., with \$339,135,716, and Curtis-Wright Corp., with \$117,747,027.

PRODUCTION BRIEFING

Fairchild Airplane division of Higgins has delivered its first production aircraft at its truck landing gear to the U.S. Army's 1st Cavalry Division, Ft. Huachuca, Ariz. Fairchild is scheduled to expand a complete spectrum of G-6s early this fall. Allowing division of General Motors acquire a mixed passenger payload of 526,764 lbs for T-49. Allouze is now the largest manufacturer of jet engines.

large subcontract from General Electric Co. to produce major components for the GE J-47 jet engine.

Grand Central Aircraft Co. of Glendale, Calif., is concluding and streamlining its Convair F334 flying boat for the British government.

Convair is averaging about \$776,000 per month in spare parts orders for the Convair F334. Similar open spare orders now stand at about \$1.5 million including 12,000 separate items.

We Pascale Industries of Los Angeles has a subcontract for pilot training on the North American T-38 trainer and the external fuel tank for the North American B-45. Production on both subcontracts is expected to run until mid-1950.

Tow Coach Co. of Buffalo is adding back production workers for a return to the Grumman F9F-2 jet fighter. Employment is expected to rise from a low of 600 to about 1200 as the project goes from tooling to production phase.

A. E. Brewster, Inc. of Buffalo, maker of equipment for shipping jet engines, reports a current backlog of \$351,000 on ordered orders and estimates 1949 sales at \$1,000,000. Total is expected to reach \$777,000 by 1950.

Boeing Airplane Co. has signed an agreement with Lockheed Air Service Inc. for acquiring at Stratocampus at Boylestad and MacArthur Field, L. I.

Irving Air Chariot Co. and its British subsidiary reported an unusual 1948 sales of \$579,773 over \$508,249. Here had a net loss of \$10,426 in 1948, with current backlog of \$1,300,000.

Amoco Engineering Corp. has appointed a T-33 sales agency for its International Engineering and Trade Dept. in Pasadena, per Resolution of Board. The Paris group is subdivided by the French government and now has 100 T-33 units ready to deliver.

Strategic Aviation Corp. of Buffalo has a backlog of \$100,000 on unfilled orders from the U. S. Air Force and Navy and has completed \$100,000 in orders from the industry. More work is for guided missiles equipped USAF aircraft, including experimental, research, training aircraft and guided missile equipment. The more recent old company is headed by Robert M. Stanley, formerly chief test pilot of Bell Aircraft Corp.

Textron Engineering & Mfg. Co. has a \$300,000 contract with the Colombian air force for delivery of 12 planes including 12 F-86 fighters, eight C-47 transports and two PBY amphibians. TEMCO also has a subcontract from Boeing to make 1000 C-47 transports and division of General Motors acquire a mixed passenger payload of 526,764 lbs for T-49. Allouze is now the largest manufacturer of jet engines.

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SALES & SERVICE

Market Picks Up for Spray Planes

Three lightplane companies offer 90-hp models which can operate at less cost than many craft now used.

By Alexander McBurney

Recent aerial portion of market shows that crop and seed plots in history appear largest that year in the principal growing season of the U.S.

For the first time, three of the major lightplane companies are turning out factory-built crop spray planes to put in the sunlight, together with those of "home-made" spray plane models already in use.

American Spray Crop, 90 hp, twin-engine plane, equipped with a Sioux Uni-Valve shop and price-tagged at \$3210, Flyway, Middlebury, makes the third entry. Previously announced:

- **Lanscene 90 hp, All-metal Sioux Spray**, equipped with a factory-installed independent crop duster spray system and price-tagged at \$3395, Flyway, Dallas.

Federal and state agricultural and aeronautical officials and the National Flying Farmers Assn. share the belief that this type of flying is in for a steady growth and that its effect on profits per acre will be enormous.

Recent recommendations by CA by Dr. Neasefield, Flying Advisory Committee, tell farmers operating their own planes to use them with greater economy and without unnecessary losses as long as they did not receive pay for those they did not expect to clear up one point which has been disturbing some farm plane owners from doing their own spraying work.

Regulatory authorities in a wider use of the airplane as a platform for broad casting sprays, dusts, and for seeding are anticipated in a number of the states.

• **McCurdy Proprietary** says for a fairly low cost by the small sprayman, who is likely to take the plane area readily of many of the big Stevensons and other higher-powered planes currently used. Cost per acre in laying the spray on the crops is a little higher because of operating a 90 hp. engine as against one with a 300 to 450 hp. engine in the size of the new factory-built planes.

Attempts to use 90 hp. lightplanes in spraying and dusting have not been too successful because the center of gravity and rate of climb are likely to allow that the 90 hp. model does enough additional power to overcome the criticism. Lanscene fits 90 hp.喷雾器 of about 600 lbs. at sea level, while the light Arrows and Flyer, with less capacity, quote slightly better rates of climb.

It is believed that the potential development of successful still spraying techniques will lessen the hazards of this type of operation when they are more universally used. But the knowledge required for proper handling of the plane for greatest efficiency, and must

not amount of skill on neighboring acres, and use of paper chemicals, in general, is primarily an educational problem.

A number of universities and colleges, through their agricultural departments, have steadily offered short courses in these subjects for farmers and citizens and flyers. Training schools of similar courses is expected to be provided at other institutions in the next few months.

Typical of such courses is one offered by Rutgers University College of Agriculture, New Brunswick, N.J., to New Brunswick, N.J., as an excellent Island

Schools include plant diseases and agents and to control them, methods of applying fungicides, insect lesions to control and what insecticides to use, controlling weeds with chemicals, the weather and its effect on disease and insect control, and some engineering methods involved in engine spraying and dusting. Classes will be conducted by the faculty of the College of Agriculture and students will be given to lectures and exercises of research work done during training and during.

License Crop Dusters

An order requiring the licensing of crop dusters has been signed by Seattle N. Donald Washington State Director of Agriculture, at the request of the Washington State Aviation Assn. The order provides that no one "commercially engaged in the application for hire of aircraft, aircraft or aircraft as balloons" must be licensed and that seeder and sprayer craft over the operator's license. Operators must inform the state of their financial responsibility and minimum certain standards for airplanes and planes.

Spraying cities of Oregon and Idaho are considering similar acts, in which case a license issued in one state would be recognized in the other.

The Washington State Board of Agriculture proposed the order, which was not final until principles were adopted, in case of accidents, were liable to pay damages.

Island Airstrip

Paul Stinger, manager of the Kelso Longview airport in Southwest Washington, is building a resort and airstrip on an island in Silver Lake, 17 miles west of Kelso. The 5000-ft. runway is expected to be ready this summer.

Robert Becklin will handle boats, motor boats, planes, ground and car storage.

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BRIEFING FOR DEALERS & DISTRIBUTORS

95,964 CIVIL PLANES—As of Jan. 1, 1949, there were 95,964 civil aircraft registered in the U. S., CAA reported. Figure showed a total 110,000 increase over the total of a year ago—54,817.

California had 16,741 planes to take first place among states, and Texas was second with 7,896. (The Texas total was a third more than the state's figure of 6,847 planes as of Jan. 1, 1948.)

Other states in which principal ownership of planes continue New York, 4,651; Illinois, 4,639; Michigan, 4,459; Ohio, 4,146; Pennsylvania, 3,475; Kansas, 3,119; Florida, 2,978; Indiana, 2,774; Oklahoma, 2,471; Iowa, 2,088; Minnesota, 2,015; Washington, 2,213; Wisconsin, 2,212; Missouri, 1,939.

State figures listed in a recent issue of the annual aircraft register in 1948, a total of approximately 70,000 planes, barely enough for replacement of planes retired for various reasons during the year.

COSMOPOLITAN SKY-DECKS—It's been a hard winter across the present plains and cold flying, and there is no better reason the latest issue of the Sky-circulating Cosmopolitan Magazine with an exclusive interview of "Dawn Patrol in the Air" by J. C. Turner. [You probably remember his graphic old article on early traffic fatalities "Sailor's Death," which used to be required reading for airline drivers in police traffic courts.]

No one is more critical of the reckless bombing pilot than his fellow flyers. And it is probable that the new Turner piece would have had a wholesale effect by convincing more floggers not to bring planes. But since an amateur editor has made the Turner indictment of the reckless pilot apply to the entire category of private plane pilots, he probably has a sub-edit which reads: "These are no amateur people involved here, these who fly private planes. These are professional aviators of whom both Let's get rid of them before they give a black eye to organized air service."

Down in Washington now, and probably in other parts of the nation too, lightplane pilots and various civil aviation groups last week had a "fire burn" about the unannounced blanket enforcement, which they were sure was coming in letters in the wagons in New York.

HELICOPTER APPOINTED—Appointment of J. D. Reed Co., of Houston, Dallas and New Orleans, as distributor for the Hiller 160 helicopter, goes United Helicopters Inc. strong recommendation in this area, since Reed is widely known as the top-ranking French distributor in the nation last year.

Reed's franchise will include Texas and Louisiana for the Hiller 160, which was sponsored by CAA for commercial sales some time back. Reed is establishing main helicarrier service facilities in his new \$500,000 twin center, Houston, with field service depots at Dallas and New Orleans bases.

Hillier helicopter sales effort will be concentrated on oil exploration, proposed transport agreements, oil well charter and pilot training.

PAPER UPS CLIPPER PRODUCTION—Piper Aircraft is upping production on the four-place 52995 Clipper plane, from four to eight planes a day, presumably to accommodate orders which the lowest-priced new four-place has generated.

HOME AWAY FROM HOME—Checkups being sent out by Radio Flying Service, at Sherman, Okla., tell a story of a new era in thoughtful and service to the personal aircraft pilot, which reads like even pilot's drama.

"Make this your office while in Sherman. Why go to hotel?" asks the letter. "Assuming your arrival are the following accommodations: free hot coffee at any hour, free beds in clean heated guest rooms for overnight transient pilots and their passengers. Clean heated showers, five dozen towels, using free linenservice to towns, laundry rates and tubs, fresh room, free steamograph-type service. We'll see you time, whether day and night, and have you on your way as early as daylight. If you work—what are we selling? Fuel, oil, storage, shop service and parts."

—ALEXANDER McSHEREY

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43700-43750-43800-43850-43900-43950-44000-44050-44100-44150-44200-44250-44300-44350-44400-44450-44500-44550-44600-44650-44700-44750-44800-44850-44900-44950-45000-45050-45100-45150-45200-45250-45300-45350-45400-45450-45500-45550-45600-45650-45700-45750-45800-45850-45900-45950-46000-46050-46100-46150-46200-46250-46300-46350-46400-46450-46500-46550-46600-46650-46700-46750-46800-46850-46900-46950-47000-47050-47100-47150-47200-47250-47300-47350-47400-47450-47500-47550-47600-47650-47700-47750-47800-47850-47900-47950-48000-48050-48100-48150-48200-48250-48300-48350-48400-48450-48500-48550-48600-48650-48700-48750-48800-48850-48900-48950-49000-49050-49100-49150-49200-49250-49300-49350-49400-49450-49500-49550-49600-49650-49700-49750-49800-49850-49900-49950-50000-50050-50100-50150-50200-50250-50300-50350-50400-50450-50500-50550-50600-50650-50700-50750-50800-50850-50900-50950-51000-51050-51100-51150-51200-51250-51300-51350-51400-51450-51500-51550-51600-51650-51700-51750-51800-51850-51900-51950-52000-52050-52100-52150-52200-52250-52300-52350-52400-52450-52500-52550-52600-52650-52700-52750-52800-52850-52900-52950-53000-53050-53100-53150-53200-53250-53300-53350-53400-53450-53500-53550-53600-53650-53700-53750-53800-53850-53900-53950-54000-54050-54100-54150-54200-54250-54300-54350-54400-54450-54500-54550-54600-54650-54700-54750-54800-54850-54900-54950-55000-55050-55100-55150-55200-55250-55300-55350-55400-55450-55500-55550-55600-55650-55700-55750-55800-55850-55900-55950-56000-56050-56100-56150-56200-56250-56300-56350-56400-56450-56500-56550-56600-56650-56700-56750-56800-56850-56900-56950-57000-57050-57100-57150-57200-57250-57300-57350-57400-57450-57500-57550-57600-57650-57700-57750-57800-57850-57900-57950-58000-58050-58100-58150-58200-58250-58300-58350-58400-58450-58500-58550-58600-58650-58700-58750-58800-58850-58900-58950-59000-59050-59100-59150-59200-59250-59300-59350-59400-59450-59500-59550-59600-59650-59700-59750-59800-59850-59900-59950-60000-60050-60100-60150-60200-60250-60300-60350-60400-60450-60500-60550-60600-60650-60700-60750-60800-60850-60900-60950-61000-61050-61100-61150-61200-61250-61300-61350-61400-61450-61500-61550-61600-61650-61700-61750-61800-61850-61900-61950-62000-62050-62100-62150-62200-62250-62300-62350-62400-62450-62500-62550-62600-62650-62700-62750-62800-62850-62900-62950-63000-63050-63100-63150-63200-63250-63300-63350-63400-63450-63500-63550-63600-63650-63700-63750-63800-63850-63900-63950-64000-64050-64100-64150-64200-64250-64300-64350-64400-64450-64500-64550-64600-64650-64700-64750-64800-64850-64900-64950-65000-65050-65100-65150-65200-65250-65300-65350-65400-65450-65500-65550-65600-65650-65700-65750-65800-65850-65900-65950-66000-66050-66100-66150-66200-66250-66300-66350-66400-66450-66500-66550-66600-66650-66700-66750-66800-66850-66900-66950-67000-67050-67100-67150-67200-67250-67300-67350-67400-67450-67500-67550-67600-67650-67700-67750-67800-67850-67900-67950-68000-68050-68100-68150-68200-68250-68300-68350-68400-68450-68500-68550-68600-68650-68700-68750-68800-68850-68900-68950-69000-69050-69100-69150-69200-69250-69300-69350-69400-69450-69500-69550-69600-69650-69700-69750-69800-69850-69900-69950-70000-70050-70100-70150-70200-70250-70300-70350-70400-70450-70500-70550-70600-70650-70700-70750-70800-70850-70900-70950-71000-71050-71100-71150-71200-71250-71300-71350-71400-71450-71500-71550-71600-71650-71700-71750-71800-71850-71900-71950-72000-72050-72100-72150-72200-72250-72300-72350-72400-72450-72500-72550-72600-72650-72700-72750-72800-72850-72900-72950-73000-73050-73100-73150-73200-73250-73300-73350-73400-73450-73500-73550-73600-73650-73700-73750-73800-73850-73900-73950-74000-74050-74100-74150-74200-74250-74300-74350-74400-74450-74500-74550-74600-74650-74700-74750-74800-74850-74900-74950-75000-75050-75100-75150-75200-75250-75300-75350-75400-75450-75500-75550-75600-75650-75700-75750-75800-75850-75900-75950-76000-76050-76100-76150-76200-76250-76300-76350-76400-76450-76500-76550-76600-76650-76700-76750-76800-76850-76900-76950-77000-77050-77100-77150-77200-77250-77300-77350-77400-77450-77500-77550-77600-77650-77700-77750-77800-77850-77900-77950-78000-78050-78100-78150-78200-78250-78300-78350-78400-78450-78500-78550-78600-78650-78700-78750-78800-78850-78900-78950-79000-79050-79100-79150-79200-79250-79300-79350-79400-79450-79500-79550-79600-79650-79700-79750-79800-79850-79900-79950-80000-80050-80100-80150-80200-80250-80300-80350-80400-80450-80500-80550-80600-80650-80700-80750-80800-80850-80900-80950-81000-81050-81100-81150-81200-81250-81300-81350-81400-81450-81500-81550-81600-81650-81700-81750-81800-81850-81900-81950-82000-82050-82100-82150-82200-82250-82300-82350-82400-82450-82500-82550-82600-82650-82700-82750-82800-82850-82900-82950-83000-83050-83100-83150-83200-83250-83300-83350-83400-83450-83500-83550-83600-83650-83700-83750-83800-83850-83900-83950-84000-84050-84100-84150-84200-84250-84300-84350-84400-84450-84500-84550-84600-84650-84700-84750-84800-84850-84900-84950-85000-85050-85100-85150-85200-85250-85300-85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STRICTLY PERSONAL

BIGS ABOUT PEOPLE—Foster (Boat) Barker became deputy chief of the traffic branch of the Office of International Trade, Dept. of Commerce, in Washington. At the present time, his main responsibility is to eliminate barriers and encourage foreign import to the United States under ECA, although the Commerce Dept. still has a parting touring trade on a world scale basis. Since founded before the Senate Interstate & Foreign Commerce Committee last week, the National Tariff Service Interests & Foreign Commerce Committee last week will continue to be the major, if not the sole, authority in the field of trade. With all its experience, who knows more about special projects than William C. Walsh Associates, 920 Fifth Ave., Paul Etchison, widely known public relations chief for Pan American, has returned to Rio, and may set up his own public relations firm. John D. Wrigley has signed as PR of Metal Products Div. of Koppers Co., Inc., to join Prudential & Leibert, public relations counsel, in NYC.

HONEYMOONERS: YOUNGER GENERATION

The appears in Trans-Canada Air Lines newsletter.

Businessmen still lead those aboard Trans-Canada North Star aircraft, although in Ottawa, most of these people being in the age group 35 to 50.

THOSE UNRAGED BRITISH RAPIDES—The deflatingly Greek names from Great Britain with the story about the lady who became a mother during a flight on one of East African Airways' newest Rapides. Sightseeing over the cageons "I only really expect a," and the independently more overwrought pilot replied with "Madame, I know these rates are low, but they isn't that slow."

CONFIDENTIAL INSTRUCTION NEEDED—The Aviation Week staff is considering a special aviation correspondence course, sent in plain envelope, for the question "Will we set our eyes, and the lady professionals, the slightly more than this have changed and learned" instruction about "pilot tubes" to read with "pilot tubes." If you don't know the difference, we'll tell you the course too.

HIGH JINKS AT THE SAE MEETING—Our own Bob McLennan just landed in from the SAE National Aeromotive and Air Transport Meeting at the Hotel New Yorker and reported that also a distinguished and well-known lecturer by no one less than on how they are improving their bolts, one J. G. Boggs, the America engineer, wound up with "For six, the airlines have told the ad companies to get the lead out of their gait."

And did anyone else remember how Douglas Aircraft's Mr. Arthur Bremson, told the one about how Col. R. R. McDonald of the Chicago Tribune had an editorial campaign all planned to name Chicago airport Col. George Marshall, until one of his reporters asked why he wanted it called Marshall Field?

THAT'S A NEW NAME FOR THEM—Northwest was conducting a sightseeing trip the other day in Seattle and one board was Aviation Week's co-pilot, Ray Birsingh, and his young son, Clyde. This was some turbulence, so Stevensons Jim Stevens brought out some prints of Northwest and says cap for possible use of a couple of kids who lost their gait. When the Northwest and their son were done with it in Seattle, USA, they were pretty well all recovered, except that a British accentuator is an American letter.

INTERNATIONAL CONFUSION—Ron Hechlinger of United Air Lines' San Francisco office says that the mechanics used an extruder to speed production of British Commonwealth Plastic Antennas' DC-4. What the day the Australian engineer showed a UAL crew to change the transponder? The crew, including the hydraulic system supervisor, concluded that the job was too big to be tackled on a single flight without causing a delay. When the Aussies and their own crew did it in five minutes, UAL, from one pretty well all recovered, found out that a British accentuator is an American letter.

Then there was the time in Australia when a mechanic to "get the tripod out of the bodas." That meant, "get the tail stand out of the belly pit." And just when confusion followed a reference to the "flap pick" which turned out to be the rear flap selector.

WHAT'S NEW

Trade Literature

"**Wynona Aircraft Seats**," second edition, 64-page booklet containing descriptions and sizes, weights, lengths and widths of carbon fiber and stainless grades of aircraft seats and available for shipment. Available open report to February. **Wynona, Joseph T. Ryerson & Son, Inc., Box 6000-A, Chicago 34, Ill.**

"**Jones-Moreno Products for the Aviation Industry**," as 8-page brochure containing references. Thorough translation included for use in jet aircraft and guided missiles, bombs, projectiles and other products. Available open report to Jones-Moreno, 22 East 46 St., New York 16, N. Y.

"**Bellanca**," a 4-page folder describing Bellanca, a packardizing parts and tools, an isolating parts, available from Delta Chemical Laboratories, Inc., 172 Pacific St., Brooklyn 2, N. Y.

"**Technical Bulletin TB-1**," a 44-page bulletin on the structure of monel, nickel and high-nickel alloys to cover uses by aerospace and available upon request to International Nickel Co., Inc., 67 Wall St., New York 5, N. Y.

"**ILG Helastic Standards for Industrial Fasteners**," a 16-page booklet compiled and approved by the manufacturing groups of the Fast Industry Cooperative, available open report to Miller Metal Co., 4827 N. Kelley Ave., Chicago 18, IL.

"**Belleville Washers-Cards**," an 8-page booklet on a device used for improved equipment removal from Belleville Co., 222 W. Market St., Akron 5, Ohio, attention W. C. Richards, Jr.

"**Naval Air Reserve Ready & Able**," a booklet on the accomplishments of a typical Naval Reserve Carrier Group and its two-week training tour, available upon request to Chief of Naval Air Training, Washington 25, D. C.

"**Asphalt Institute Quarterly**," a magazine published by members, employees of the Asphalt Institute, edited by Ernest M. Brinkley. Available open report to The Asphalt Institute, 1011 Sixth and Ave., New York 17, N. Y.

"**Bellanca 2200**," a 4-page catalog section on Carburetor belts, available open report to E. F. Goodrich Co., Akron, Ohio.

—E. H. W.

AVIATION WEEK, April 18, 1969

ADVERTISERS IN THIS ISSUE

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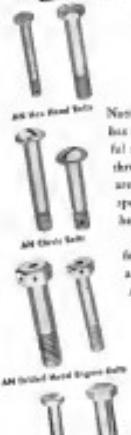
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AVIATION WEEK, April 18, 1969

EDITORIAL

A Bigger & Better Dinosaur

The New York Herald Tribune says the U. S. Government, through the Maritime Commission, has decided to pay \$42,285,781 of your money toward an American shipowner that "will go after a new trans Atlantic speed record." Total cost of the liner will be about \$70 million.

This "superliner" will be 580 feet long, gross 45,000 tons, and carry 2000 passengers (if she can capture them) in "luxury accommodations." It will take a thousand men to run her. As a trooper she will be able to carry a full division, her sponsor says, and she will be the largest passenger ship ever built in the country.

Vice Admiral William W. Smith, chairman of the Maritime Commission, described the decision to build the ship as "one of the most important the commission has ever made."

Now, as a trooper, please consider:

1. As far as you are concerned, is it worth even the initial \$42 million to buy a boat that will "go after" the mythical trans Atlantic blue ribbon? Or something better than 3 days, 20 hours, 47 minutes eastbound?

2. Is it worth over the initial investment (ignoring maintenance and operating forever after) to substitute that new moniker, instead of the America, as "the largest passenger ship ever built in the country"? (It does not compare in size with either the Queen Mary or Elizabeth).

3. Do you know that no superliner pays its way in commercial service, and that this one will require continual subsidy?

4. If this ship is needed in national emergency, do you know we have literally hundreds of vessels in mothballs? And if you are thinking about the difference between 30 or 34 knots and 30 knots, do you think that whenever in emergency time really gets to mean anything we will be content with surface transportation in an enlightened age of five-miles-an-hour, 100 or 200 passenger ships?

So if that would concession of the Maritime Commission won't pay for itself commercially or be needed urgently in war, why should the American taxpayer finance the construction of an unprofitable \$70 million donation that will only break the speed record of other (and legal) steamers?

John M. Franklin, president of the United States Lines, points out with strange pride that this liner "will be the first American ship that can compete with the best of foreign flag ships since the St. Louis and St. Paul were built in 1895 by the American Line," and he explains even further, "This nation has not owned a trans-Atlantic record holder since the Cunard Line's Pacific, whose crossing of 9 days, 19 hours, 25 minutes was made in May, 1891.

Now, Mr. Franklin, so what? When are you going

out to nominate the timid last record for us, too?

If that represents one of the Maritime Commission's "most important" decisions we nominate it at the same time as the most stupid and most expensive. Cost Britain holds her two Queens in high esteem, but we well singer the carry British would give their eyeballs if they had instead, America's leadership in air transport manufacturing and operation. It's difficult for us Americans to realize how much material pride a British man would have in buying U. S. Superliners through the Soviets, at paravane prices, before even taking delivery of the six they already have on order from America.

The Maritime Commission is living in the past but the money it is costing us isn't.

We think Congress ought to look into this one.

The Coach Phenomenon

Capital Airlines President J. H. Carmichael invited some astonishing figures to the New York Society of Security Analysts last week on the success of his company's pioneering air coach service:

In the 12 months to Nov. 4, 1948, Capital earned a total of 1653 through passengers between Chicago and New York. An aircoach service began Nov. 4.

In the first five months of air coach service the line carried slightly more than 20,000 passengers.

Capital's load factor optimization, especially since it began air coach flights on other segments, has been rising steadily. Coach planes, because they leave in the early hours of the morning, pick up heavy mail and cargo loads. Few regular air planes have ever departed late at night.

President Carmichael reports that with air coaches Capital has added 3000 miles of flying a day by having only about 20 more planes. He says fully that air coach is profitable.

He estimates that 75 percent of Capital's coach passengers would not have flown at all if air coach had not been offered. Nearly all of that 75 percent represented newly generated business. About 30 to 35 percent of the coach passengers represent revenue from regular air service, according to questionnaire.

But in Carmichael's opinion, many passengers who make their first flight because of price find they like flying well enough to ride first class next time. By introducing hundreds of passengers to the advantages of air transportation, Capital believes it is making new customers not only for itself, but for the entire industry. We believe it, too.

And while some executives are pointing out that eight feet between a heading for new lights as we get into fine weather, may we ask what makes them think reduced seat travel shouldn't rise even higher and faster?

ROBERT H. WOOD



The *Passenger* is the payoff

Commercial airline operations pay off for the airline and for the aviation equipment manufacturer only if it pleases and satisfies the customer—the passenger.

That's where Sperry, for instance, is so bold equipment that helps the airline give the passenger a smoother, safer, more comfortable ride. He is the man toward whom much of the engineering skill research and development work at Sperry is aimed.

Behind the instrument panel and in the cockpit of every modern airplane stands research and engineering skill. Sperry provides for airline use, for

example, the A-12 Gyrojet* for smooth level flight... the Automatic Approach Control for landings in all kinds of weather... the Gyrostabilizer and other flight instruments for accurate information on position and direction... the Engine Analyzer to check engine performance during flight, saving valuable time on the ground.

* Meanwhile, Sperry research and engineering development go forward in continuous search for new and better aids for aviation. © 1949 The E. I. du Pont de Nemours & Company, Inc.

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"Now we can increase our sales calls by 40% over those we could make by fastest public transportation," says President J. E. Hall, Jr. "If we hear of a potential sale in another state, we have a man there in hours. And customers like fast action when waiting for equipment. Oil rig time is expensive. Now our men, with equipment, get there pronto by Bonanza."



Sales Manager John Hall even uses his Bonanza as "reconnaissance"; spots well locations from the air, follows up with sales calls. Because Bonanzas are quiet and comfortable, they're ideal as customer transports. Cost of operation? About the same gas and oil consumption per mile as an auto! This Bonanza fleet is a profitable, paying proposition.

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Apply this revolutionary business "machine" to your business. It means you slice travel-time by two-thirds... a saving you put to *profitable* use. Investigate. A note on your company letterhead brings an informative 60-page brochure on "The Air Fleet of American Business." Write today to Beech Aircraft Corporation, Wichita, Kansas, U. S. A.

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